IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Previously Presented): A power factor improving circuit comprising:

a boost reactor which inputs a rectified voltage obtained by rectifying an AC power supply voltage of an AC power supply by a rectifier circuit;

a main switch which inputs the rectified voltage through the boost reactor and is turned on/off;

a converting section which converts a voltage, which is obtained when the main switch is turned on/off, into a DC output voltage; and

a control section which controls turn-on/off of the main switch to shape an AC power supply current to sine wave form, controls the DC output voltage of the converting section to a predetermined voltage, and controls a switching frequency of the main switch and a switching duty cycle of the main switch according to a momentary value of current wave form of current flowing into the AC power supply or that of current flowing into the rectifier circuit or that of current flowing into the main switch.

Claim 2 (Previously Presented): A power factor improving circuit comprising:

a boost reactor which has a primary winding and a feed back winding connected to the primary winding in series and coupled to the primary winding and includes a leakage inductance more than a predetermined inductance value;

a first series circuit which is connected between one output terminal of a rectifier circuit which rectifies an AC power supply voltage of an AC power supply and another output terminal thereof, and includes the primary winding of the boost reactor, a first diode, and a smoothing capacitor;

a second series circuit which is connected between the one output terminal of the rectifier circuit and another output terminal thereof, and includes the primary winding of the boost reactor, the feedback winding, and a main switch;

a second diode which is connected between a junction of the main switch and the feedback winding and the smoothing capacitor; and

a control section which controls turn-on/off of the main switch to shape an AC power supply current to a sine wave, controls an output voltage of the smoothing capacitor to a predetermined voltage, and controls a switching frequency of the main switch and a switching duty cycle of the main switch according to a momentary value of current wave form of current flowing into the AC power supply or that of current flowing into the rectifier circuit, or that of current flowing into the main switch.

Claim 3 (Previously Presented): The power factor improving circuit according to claim 1, wherein the control section comprises:

an error voltage generating section which amplifies an error between the output voltage and a reference voltage to generate an error voltage signal;

a current detecting section which detects the current flowing into the AC power supply, the current flowing into the rectifier circuit, or the current flowing into the main switch;

a frequency control section which generates a frequency control signal obtained by changing the switching frequency of the main switch according to the value of the current detected by the current detecting section; and

a pulse width control section which controls a pulse width based on the error voltage signal of the error voltage generating section and generates a pulse signal obtained by changing the switching frequency of the main switch according to the frequency control

signal generated by the frequency control section, and applies the pulse signal to the main switch to control the output voltage to a predetermined voltage.

Claim 4 (Previously Presented): The power factor improving circuit according to claim 1, wherein the control section sets the switching frequency of the main switch to a lower limit frequency when the current flowing into the AC power supply, the current flowing into the rectifier circuit, or the current flowing into the main switch is a lower limit setting current or less, the control section sets the switching frequency to an upper limit frequency when the current is an upper limit current or more, and the control section gradually changes the switching frequency from the lower limit frequency to the upper limit frequency when the current ranges from the lower limit setting current to the upper limit setting current.

Claim 5 (Currently Amended): The power factor improving circuit according to claim 1, wherein the control section sets the switching frequency of the main switch to an upper limit frequency when the current flowing into the AC power supply or the current flowing into the rectifier circuit or the current flowing into the main switch is an upper setting current or more, the control section gradually changes the switching frequency from ~~the~~ a lower limit frequency to the upper limit frequency when the current ranges from ~~the~~ a lower limit setting current to the upper limit setting current, and the control section stops a switching operation of the main switch when the current is below the lower limit setting current.

Claim 6 (Previously Presented): The power factor improving circuit according to claim 1, wherein the control section sets the switching frequency of the main switch to a

minimum frequency when the current flowing into the AC power supply, the current flowing into the rectifier circuit, or the current flowing into the main switch is equal to or less than a predetermined current, and the control section sets the switching frequency of the main switch to a maximum frequency when the current exceeds the predetermined current.

Claim 7 (Previously Presented): The power factor improving circuit according to claim 1, wherein the boost reactor has a characteristic which reduces an inductance value when the value of the current flowing into the boost reactor is increased.

Claim 8 (Previously Presented): The power factor improving circuit according to claim 1, wherein the control section reduces the switching frequency of the main switch when an average value of the current flowing into the AC power supply, that of the current flowing into the rectifier circuit, or that of the current flowing into the main switch is less than or equal to a predetermined value.

Claim 9 (Previously Presented): The power factor improving circuit according to claim 1, wherein the control section stops a switching operation of the main switch when an average value of the current flowing into the AC power supply, that of the current flowing into the rectifier circuit, or that of the current flowing into the main switch is equal to or less than a predetermined value, and the control section starts the switching operation of the main switch when the output voltage is less than a predetermined voltage.

Claim 10 (Previously Presented): The power factor improving circuit according to claim 1, wherein the control section comprises:

a current detecting section which detects the current flowing into the AC power supply, the current flowing into the rectifier, or the current flowing into the main switch;

an error voltage generating section which amplifies an error between the output voltage and a first reference voltage to generate an error voltage signal;

a current detection amplifying section which amplifies an error between a voltage, which is proportional to the current detected by the current detecting section, and a second reference voltage to output a voltage amplifying signal;

a voltage varying section which outputs a voltage signal obtained by varying the voltage amplifying signal of the current detection amplifying section according to a value of the error voltage signal from the error voltage generating section, as the second reference voltage to the current detection amplifying section;

a frequency control section which generates a frequency control signal obtained by changing the switching frequency of the main switch according to the value of the current detected by the current detecting section; and

a pulse width control section which controls a pulse width according to the value of the voltage amplifying signal of the current detection amplifying section, generates a pulse signal obtained by changing the switching frequency of the main switch according to the frequency control signal generated by the frequency control section, and applies the pulse signal to the main switch to control the output voltage to a predetermined voltage.

Claim 11 (Previously Presented): The power factor improving circuit according to claim 2, wherein the control section comprises:

an error voltage generating section which amplifies an error between the output voltage and a reference voltage to generate an error voltage signal;

a current detecting section which detects the current flowing into the AC power supply, the current flowing into the rectifier circuit, or the current flowing into the main switch;

a frequency control section which generates a frequency control signal obtained by changing the switching frequency of the main switch according to the value of the current detected by the current detecting section; and

a pulse width control section which controls a pulse width based on the error voltage signal of the error voltage generating section and generates a pulse signal obtained by changing the switching frequency of the main switch according to the frequency control signal generated by the frequency control section, and applies the pulse signal to the main switch to control the output voltage to a predetermined voltage.

Claim 12 (Previously Presented): The power factor improving circuit according to claim 2, wherein the control section sets the switching frequency of the main switch to a lower limit frequency when the current flowing into the AC power supply, the current flowing into the rectifier circuit, or the current flowing into the main switch is a lower limit setting current or less, the control section sets the switching frequency to an upper limit frequency when the current is an upper limit current or more, and the control section gradually changes the switching frequency from the lower limit frequency to the upper limit frequency when the current ranges from the lower limit setting current to the upper limit setting current.

Claim 13 (Currently Amended): The power factor improving circuit according to claim 2, wherein the control section sets the switching frequency of the main switch to an upper limit frequency when the current flowing into the AC power supply or the current

flowing into the rectifier circuit or the current flowing into the main switch is an upper setting current or more, the control section gradually changes the switching frequency from ~~the~~ a lower limit frequency to the upper limit frequency when the current ranges from ~~the~~ a lower limit setting current to the upper limit setting current, and the control section stops a switching operation of the main switch when the current is below the lower limit setting current.

Claim 14 (Previously Presented): The power factor improving circuit according to claim 2, wherein the control section sets the switching frequency of the main switch to a minimum frequency when the current flowing into the AC power supply, the current flowing into the rectifier circuit, or the current flowing into the main switch is equal to or less than a predetermined current, and the control section sets the switching frequency of the main switch to a maximum frequency when the current exceeds the predetermined current.

Claim 15 (Previously Presented): The power factor improving circuit according to claim 2, wherein the boost reactor has a characteristic which reduces an inductance value when the value of the current flowing into the boost reactor is increased.

Claim 16 (Previously Presented): The power factor improving circuit according to claim 2, wherein the control section reduces the switching frequency of the main switch when an average value of the current flowing into the AC power supply, that of the current flowing into the rectifier circuit, or that of the current flowing into the main switch is equal to or less than a predetermined value.

Claim 17 (Previously Presented): The power factor improving circuit according to claim 2, wherein the control section stops a switching operation of the main switch when an average value of the current flowing into the AC power supply, that of the current flowing into the rectifier circuit, or that of the current flowing into the main switch is equal to or less than a predetermined value, and the control section starts the switching operation of the main switch when the output voltage is equal to or less than a predetermined voltage.

Claim 18 (Previously Presented): The power factor improving circuit according to claim 2, wherein the control section comprises:

a current detecting section which detects the current flowing into the AC power supply, the current flowing into the rectifier, or the current flowing into the main switch;

an error voltage generating section which amplifies an error between the output voltage and a first reference voltage to generate an error voltage signal;

a current detection amplifying section which amplifies an error between a voltage, which is proportional to the current detected by the current detecting section, and a second reference voltage to output a voltage amplifying signal;

a voltage varying section which outputs a voltage signal obtained by varying the voltage amplifying signal of the current detection amplifying section according to a value of the error voltage signal from the error voltage generating section, as the second reference voltage to the current detection amplifying section;

a frequency control section which generates a frequency control signal obtained by changing the switching frequency of the main switch according to the value of the current detected by the current detecting section; and

a pulse width control section which controls a pulse width according to the value of the voltage amplifying signal of the current detection amplifying section, generates a pulse

signal obtained by changing the switching frequency of the main switch according to the frequency control signal generated by the frequency control section, and applies the pulse signal to the main switch to control the output voltage to a predetermined voltage.

Claim 19 (Canceled).